

# A Space Man's Look at Antarctica

Seeking lessons for lunar and planetary missions, the author and other NASA leaders pay a visit to the South Pole, and make a tour of U.S. research bases on a frozen continent

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As a stand-in for Mars would this site serve Wright Dry Valley, one of several accessible by helicopter in Royal Society Range, is inspected by Dr. Gilruth, Faget, and von Braun. Because life is just beginning to find a foothold in these "dry valleys" left by receding glaciers, they're being studied as a possible proving ground for instruments to detect traces of bacteria and other life forms on Mars.

At South Pole, space men march around marker—and, with broad grins, claim "orbiting" earth in less than five seconds. Facing camera are Dr. Gilruth and (behind him) Dr. von Braun.





It may well be smart to test lunar vehicles or surface drills in Antarctica before taking them to the moon. It may be a good idea to try out automated life-detecting equipment in the Antarctic's unique dry valleys before it's sent to Mars. And, more important in my view, our Antarctic activities offer lessons for the whole procedure of space exploration.

Those are impressions of a week I spent in Antarctica last January, as a member of a NASA party that included Dr. Robert R. Gilruth, Director of the Manned Spacecraft Center in Houston; Dr. Maxime Faget, Houston's Director of Engineering and Development; and Dr. Ernst Stuhlinger, head of the Research Project Laboratory at the Marshall Space Flight Center.

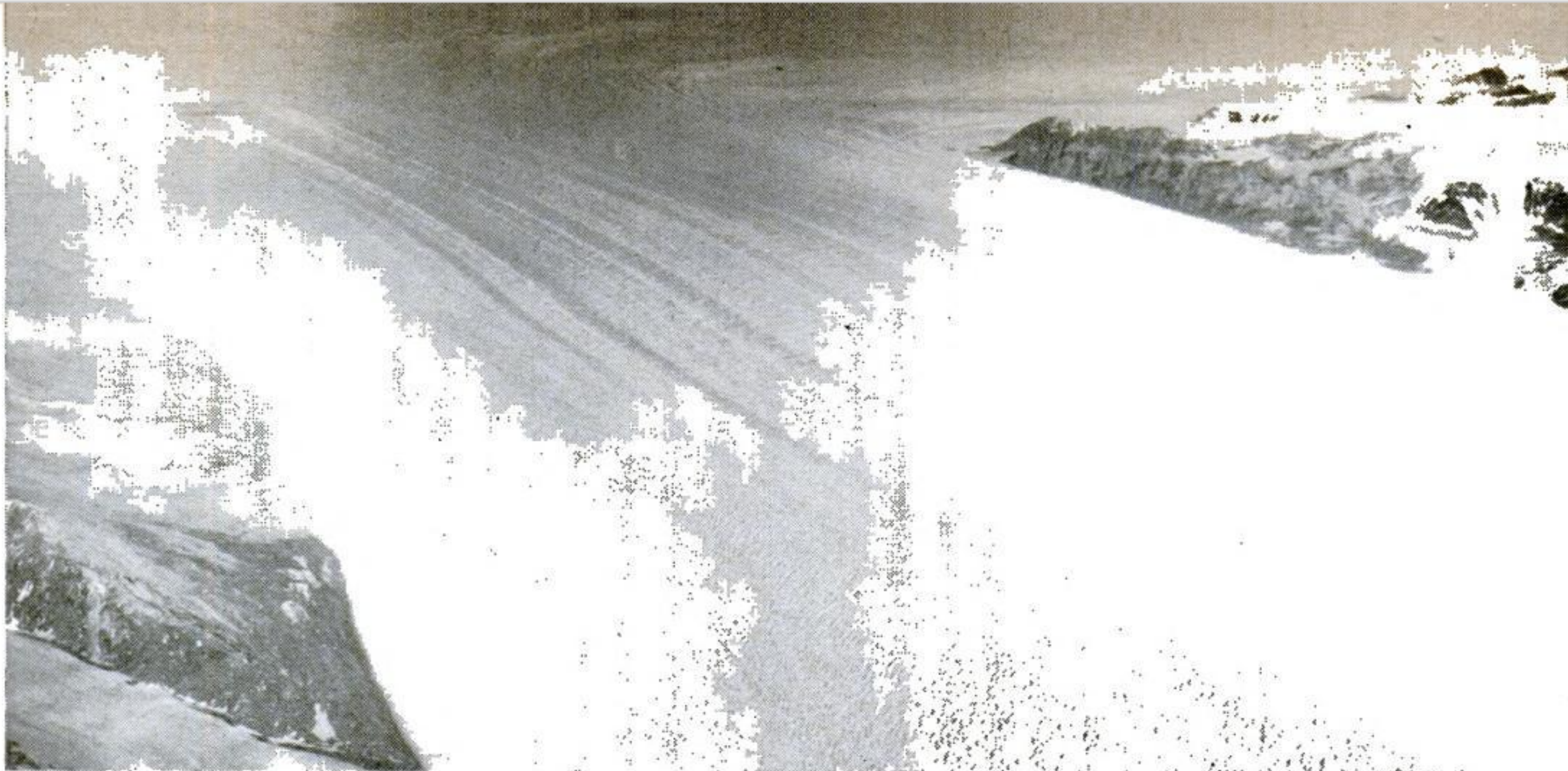
We went down to see what we could learn for our space program from man's activities at his last real frontier on earth. True, Antarctica has an atmosphere, while

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**Dr. von Braun meets the penguins**—and gets emphatically told by one to mind where he's walking—at a rookery on Cape Royds near the McMurdo base.







**Beardmore Glacier**—probably the largest in world, 45 miles wide and 250 miles long—is viewed from

air. Planes, helicopters, and tractors ease Antarctic travel today, though dog sleds still find use.

the moon has none. A parka in lieu of a space suit wouldn't do on the moon. And the moon doesn't expose astronauts to Antarctic dangers of blizzards and whiteouts. But the two scenes have much in common:

In both programs, the major objective is scientific research. Success hangs on a long, complex, costly, vulnerable line of logistics. Rewards, besides scientific knowledge, extend to all aspects of conducting exploration. One of the most valuable will be a yearly crop of men imbued with the spirit of exploring, seasoned by the hardship of the environment, and experienced in the

teamwork that all major efforts require today. Finally, both in Antarctica and space, America is not alone in seeking to explore a new frontier.

**Where space men went.** Using McMurdo Station, the American "port of entry" and key supply point, as our staging base, we visited New Zealand's nearby Scott Base and five more U.S. stations in Antarctica.

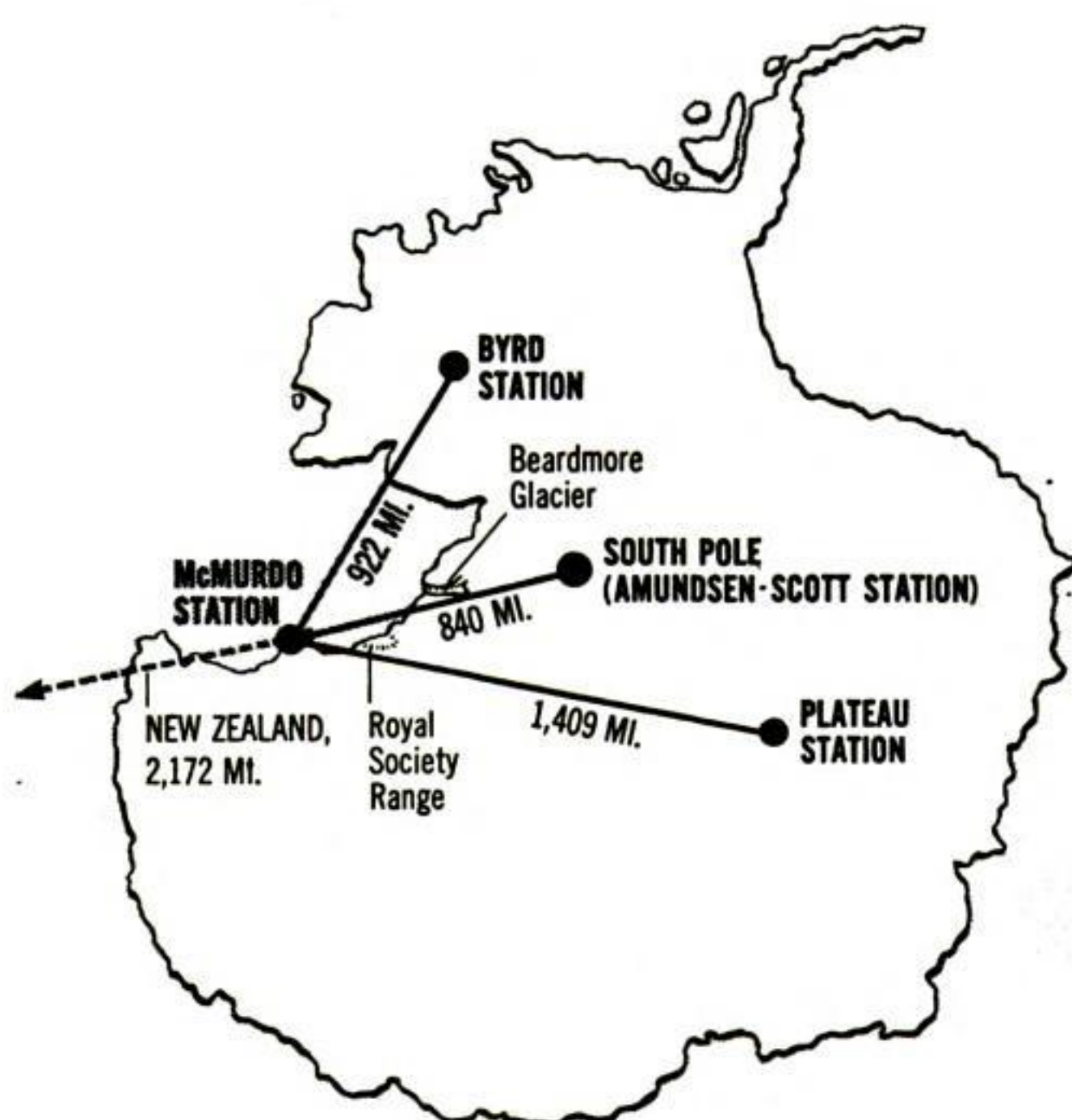
We spent a night at Amundsen-Scott Station, right on the geographic South Pole—and couldn't resist the temptation to go our astronauts one better by walking around the earth in less than five seconds per "orbit." We stayed overnight at Byrd Station, a veritable city of trailer-type accommodations completely buried under ice and snow. We visited pioneers' huts built of two-by-fours more than 50 years ago.

We tried every means of Antarctic travel—huge four-engine Lockheed LC-130 turboprops, helicopters, Snow-Cats, motor toboggans, dog sleds. We flew across the vast glittering expanse of central Antarctic ice fields and landed at Plateau Station, at an elevation of over 12,000 feet. We were overwhelmed by the grandeur of such sights as the enormous Beardmore Glacier and the Royal Society Range.

And our trip brought us face to face with everyday realities of our great national Antarctic program—conducted, like our space program, by a breed of wonderful people in a starkly beautiful but unforgiving environment. What did we learn?

Lessons came in bits and pieces, from the whole range of activities we saw. All

[Continued on page 200]



**Map of Antarctica** shows some of the U.S. bases visited by space men. McMurdo Station tracks satellites, and Byrd Station collects data from them.



## A Space Man's Look at Antarctica

[Continued from page 116]

will save our space program time, money, and frustrations. Here are samples, not to be considered as final conclusions but as food for thought and further study:

**Who's to give orders.** Research at a typical U.S. Antarctic station may be in fields as varied as radio-wave propagation, upper-atmosphere studies, glaciology, microbiology, and the breeding habits of the skua, a gull-like bird of prey. The scientists' activities and needs are coordinated by a Station Scientific Leader, who is responsible to the National Science Foundation's Office of Antarctic Programs.

But the scientists depend for their well-being, and their very survival in an emergency, on the U.S. Navy—which builds, maintains, and supplies the Antarctic stations, and provides communications and air transportation. So each major station has an Officer-in-Charge—representing the Commander, Naval Support Force, Antarctica—who sees to the safety and support of all personnel. In an emergency, jointly determined by him and the Station Scientific Leader, he takes full command.

Would the problem be very different in a space station for astronomical research, we wondered, if the life-support system started acting up? Maybe a future space station, too, should have both a Station Scientific Leader, and an Officer-in-Charge—an astronaut with an aviation and manned-space-flight background.

**Fall-back camps.** Fire is considered the greatest hazard for an Antarctic station. Besides a fire-warning system and extinguishers, each station has a "fall-back" camp a few thousand feet or so away. It provides emergency shelter, food, and medical supplies for all the staff, and has its own radio. If fire destroyed the main station the men could thus ride out even a two-week blizzard, until a rescue party arrived. Wouldn't this be a good idea on the moon, too? And how about a "fall-back" camp for a manned space station?

**Prefabricated stations.** Unlike early huts nailed together at the site, the most modern ones we saw were completely built and equipped in the U.S. Plumbing and wiring were installed and checked, and even the pinup girls seemed to have been pasted on living-room walls, before they were flown to their locations. Preparing your station

as completely as possible before you ship it out into the cold seemed good for space, too.

**Surface vehicles.** Whether or not we try out moon vehicles in Antarctica, we saw lessons for their design, in down-to-earth experience with a variety of land vehicles used there—Tucker Snow-Cats for long treks, three-wheeled Gnats for short hauls around McMurdo and Scott bases, small motor-toboggans and larger Thiokol Trackmasters on the plateau:

Riders in bulky clothes must be able to climb in and out freely. Vehicles must be easy to load and unload. Major parts—engines, tracks—should be interchangeable in the field by men in Arctic gear. Vehicles must be towable. Most important, different purposes demand different vehicles.

Antarctica offered other hints for our space program—in patterns for research, in choosing men and sustaining morale. And already in progress there are some actual space activities.

**Space work in Antarctica.** Since 1965, a Doppler tracking station at McMurdo has recorded more than 700 satellite passes monthly. Byrd Station regularly collects data from some U.S. and Canadian satellites. Those in polar and near-polar orbits cross the Antarctic at every circuit. And data tell of the interesting "hole" in the Van Allen Radiation Belt, where the earth's magnetic-field lines dip down to converge at the South Magnetic Pole.

Less than 100 miles from McMurdo in the Royal Society Range are Antarctica's "dry valleys," formerly covered by glaciers. Due to reduced snowfall in recent centuries, the glaciers have receded, and exposed virgin expanses of rock and pebble-strewn soil. Life, in the form of organisms carried by the wind and bird droppings, is just finding a foothold. Here is an ideal setting to study detection of traces of life on other planets.

NASA's Jet Propulsion Laboratory in Pasadena has a brilliant microbiologist doing field work in the dry valleys, in preparation for the Voyager spacecraft project. Ultimately, maybe Martian-life-detecting instruments should be tested in the dry valleys, where men can go in and compare the instruments' findings with the real facts. And the future may well bring other uses of Antarctica as a proving ground for space equipment.

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